SOLDIERS GUIDE FOR PREVENTION OF COLD WEATHER INJURIES

The common-sense guide to planning, training, and preparing for cold weather operations in Afghanistan

Historical Information

In the Korean War

- 8,000 cold weather casualties the first winter.
- Decreased to 1,000 the second winter with preventative measures.

Results of Cold Weather Injuries

- Napoleon and Hitler both lost Russia to Cold Weather Injuries.
- US Army lost 91,000 troops in World War II.

Korea War – Chosen Reservoir

"Medical supplies froze; morphine surettes had to be defrosted in a medic's mouth before it could be injected; frozen blood plasma was useless on the battlefield."

Napoleon's Lost Army

"The snow came down, men froze, and horses starved."

Slips/Trips/Falls

FY 12 Winter Injuries/Accidents

27 injuries - including 4 medevaced out of theater

4 vehicle accidents

Root Cause – Failed to Maintain Situational Awareness

A Typical Cold Weather Casualty…

…is 20 years old.

…is from a southern state.

…is an E4 or below.

…has less than 18 months time in service.

…has had a cold weather injury before.

…wears cold weather gear when not needed

…tries to sleep in a vehicle.

Hypothermia

Number One Killer
- Loss of 4 or more degrees F body temp.
- Wet body contributes.

Cause
- Continued Exposure.
- Depleted energy supply.

Symptoms
- Shivering.
- Slow and Shallow Breathing.
- Slow Speech.
- Loss of Coordination.
- Memory Lapse.
- Hunger, nausea, fatigue.

Don't Leave Safety Out in the Cold

With winter looming just around the corner, Soldiers are at risk of getting cold weather injuries if the proper controls to minimize hazards are not in place.

Cold Weather Injuries

- Hypothermia
- Chilblains
- Trench/immersion foot
- Frost-nip
- Frost bite
- Snow blindness
- Carbon monoxide poisoning
- Dehydration

How to Prevent Snow Blindness

Snow blindness is a condition in which the intense UV rays reflected off the snow combine with those directly from the sun to burn your cornea, causing pain and visual impairment. Snow blindness is a concern for operations at high altitudes. Those that plan to be out in the snow for extended periods of time should take precautions against this conditions.

Carbon Monoxide Exposure

TF MULESKINNER MEDICAL/SAFETY ALERT

TF MULESKINNER MEDICAL/SAFETY ALERT

CARBON MONOXIDE

AFGHANISTAN 12-24

When the mission takes you through the Salang Tunnel, your travels put you at risk to more than just hostile fire. Environmental dangers are present and awareness is key to your safety. The danger of carbon monoxide poisoning is real, especially if you are sitting idle in the tunnel for any amount of time. At the present time, your convoy medics maintain portable oxygen tanks to treat your symptoms, should you succumb to high altitude, carbon monoxide or other toxic respiratory chemical poisoning.

What is Carbon Monoxide?

Carbon Monoxide (CO) is a poisonous, colorless, tasteless, odorless gas. CO gas is generated as a waste product of the incomplete combustion of coal, wood, oil, and other petroleum based fuels (e.g. gasoline, propane, etc). CO gas, although odorless, usually occurs in a combination of combustion by-products that have distinctive odors. The primary source of CO gas is the internal combustion engine.

Health Hazards:

CO is a chemical asphyxiate which means that it reduces the blood's ability to carry oxygen. Asphyxiation, or suffocation, occurs when the blood does not deliver enough oxygen to the body. CO gas is absorbed through the lungs into the bloodstream. Inhalation of CO gas may cause headaches, nausea, dizziness, weakness, rapid breathing, unconsciousness and death. High concentrations of CO may be rapidly fatal without producing significant warning symptoms. Exposure to this gas may aggravate preexisting heart and artery disease conditions. As CO gas is odorless, there may be no odor warning if toxic concentrations are present. If you suspect CO poisoning, move the person immediately to fresh air, away from the source of the CO and upon medical advice administer O_2.

Who is at Risk?

Personnel stuck in tunnels due to accidents, avalanches, traffic jams or vehicles running inside a building are at risk for CO poisoning. Other exposures can include welders, mechanics, and warehouse personnel.

Methods of Control of Carbon Monoxide

Ensure officials at the tunnel are aware that you are inbound; they can clear traffic to ensure your traverse is speedy. To reduce the chances of CO poisoning in the workplace, use ventilation systems, exhaust hoses and if needed open doors and windows.

TF MULESKINNER MEDICAL/SAFETY ALERT

TASK FORCE MULESKINNER MEDICAL CONTACT DSN(318)481-9396 CONTACT SAFETY CONTACT DSN:(318)431-3305

Think War – Do Right – Build Teams – Eliminate Hassle – Grow Leaders

Some type of emergency supplemental oxygen supply is in procurement

Avalanches

Muleskinner Resources

Hypothermia

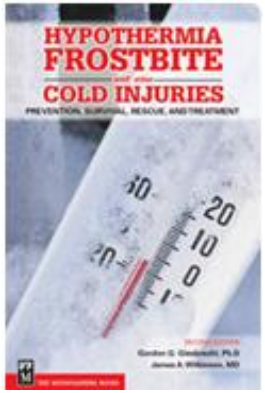
- Hypothermia is most likely at very cold temperatures, but
  - It can occur even at cool temperatures (above 40°F) if a person becomes chilled from rain, sweat, or submersion in cold water.
  - Body temperature falls below 95 degrees

Hypothermia

Number One Killer
- Loss of 4 or more degrees F from body temp.
- Wet body contributes.

Cause
- Continued Exposure.
- Depleted energy supply.

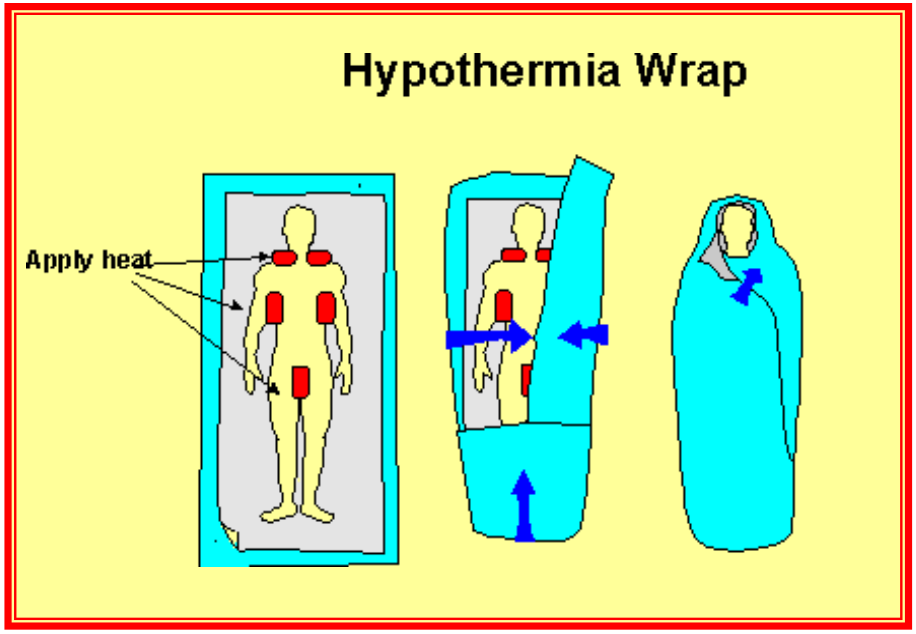
Symptoms
- Shivering.
- Slow and Shallow Breathing.
- Slow Speech.
- Loss of Coordination.
- Memory Lapse.
- Hunger, nausea, fatigue.



Hypothermia

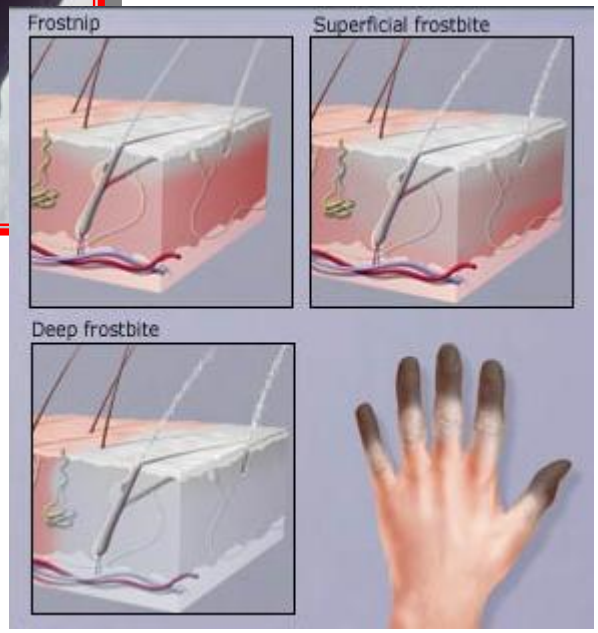
Treatment

- End exposure.
- Warm beverages.
- Keep victim in warm, dry clothes.
- Gradually re-warm.



Frostbite

- True freezing injury of tissues.
- Onset signaled by sudden blanching of the skin of nose, ears, cheeks, toes, followed by tingling.
- Frostbite has declared itself when these areas are painless.
- Intense coldness followed by numbness.



Frostbite

Second Degree or Superficial

- Entire epidermis.
- Skin redness in fair individuals.
- Grayish discoloration in darker skinned individuals.
- Clear blister formation at 24-36 hours followed by sheet like desquamation.
- Persistent cold sensitivity in the area.

Frostbite

Third and Fourth Degree or Deep

- Loss of sensation with pale, yellow, waxy look if unthawed.
- Poor capillary refill.
- Tissue loss.
- Hemorrhagic bullae form in 3rd degree injuries at 12-35 hours unless re-warming is rapid.
- Red discoloring 1-5 days after injury.
- 4th degree characterized by gangrene, necrosis, auto-amputation.
- Permanent anatomic and functional loss.

CW Injury Prevention Tips

- ***Principles of Care***
  - Frequent sock changes
    - In WW1, the Brits decreased trench foot cases from 29,000 in 1915 to 443 in 1917 by sock changes.
  - Cover head and neck, 80% of heat loss.
  - Use synthetic fibers, natural fibers retain moisture and have poor wicking ability.

- ***Modification of Risk Factors***
  - Adequate nutrition: 3000-4000 cal/day.
  - Adequate hydration and rest.
  - Adequate clothing: loose, layered, windproof and changed often.
  - Buddy and supervisor checks.
  - Previous cold weather exposure and experience.

Shelter

Shelter from weather is critical.

- The standard shelter is the tent, but improvised shelters (snow caves, snow trenches, lean-tos, etc.) can be constructed from local materials. Use existing buildings when possible.
- Use a tent liner for better insulation.
- In tents, soldiers should sleep in long underwear and socks with all other clothing hung up to dry.
- Ensure adequate ventilation to avoid moisture build up in clothing and sleeping bags.

Heaters

- ***<u>There are several heaters for use inside tents. The type of heater required depends on the size of the tent or shelter.</u>***
- For example; Space Heater Arctic (SHA) is a 28KBTU heater that is designed to provide heat for the 10 man arctic tent and other tentage with floor area between 100 & 200 square feet. The SHA replaced the Yukon heaters which has severe operational deficiencies and poses a serious safety hazard in the field.
  - Larger capacity stoves are available for the bigger tents.
  - See Family of Space Heaters (FOH) for authorized heaters.
- ***<u>Care must be used to prevent melting the frozen ground beneath or around the stove.</u>***
  - By using a tent liner, removing loose snow and ice from the ground before setting up the tent, and preventing the tent from overheating, melting can be minimized.
  - If available, plywood tent flooring and metal trays under the stove can be used to reduce melting.
- **<u>Ensure that stoves have adequate exhaust from the shelter.</u>**

Cold Weather Sleep Tips

- **Prepare an insulation layer between ground and sleeping bag.**
- **In improvised shelters, only boots and the outermost clothing layer should be removed. Place clothing under the sleeping bag where it can add insulation without accumulation moisture from the body.**
- **Relieve yourself before you go to sleep.**
- **Eat a candy bar or part of an MRE before you sleep to give you energy which will help keep you warm.**
- **Fill canteen and put in your sleeping bag so water won't freeze.**
- **Under extremely cold conditions, wipe off boots and put in the sleeping bag. This will allow your boots to stay warm.**

Dressing for the C O L D

- Keep Clothing Clean

Dirt and grease block up the air spaces in your clothing and reduce the insulation value.

- Avoid Overheating

Sweat can freeze on outer layers. Stay dry, moisture will decrease the insulating ability of your clothing.

- Wear Clothing in Layers

Loose clothing allows air spaces to help trap warm air without restricting blood circulation. Good blood circulation helps to prevent frostbite.

- Keep Clothing Dry

You've got to keep your clothing dry, from the outside as well as from the inside.

Cold Weather Uniform (ECWCS)

Layering System

- The first layer: Poly propylene underwear and either the green or black issued socks.
- The second layer: bear suit.
- The third layer: field jacket liner (optional, but keep it handy).
- The fourth layer: GORTEX parka and pants.

Additional Items

- Neck gaiter and balaclava:
  - Used for head and neck.
- GORTEX parka hood:
  - Can also be worn with the Kevlar helmet.
- Black, vapor barrier boots:
  - Ensure the boots are dry. Wick water out with old socks if wet. The tops of the worn wool socks should be turned down over the cold weather boots.
- Cold weather mittens:
  - Ensure they fit loosely to allow circulation and ventilation.

6 Keys to Healthy Feet

- Get into a warm area if possible. Remove your boots and socks. Dry your feet, especially between your toes.
- Use foot powder.
- Massage your feet for about five minutes increasing circulation.
- Put on a dry pair of socks.
- Wipe out the inside of your boots to dry.
- Do this every 4 hours.

“Footwear”

- Anytime the temperature is below freezing and your duty requires you to be outside most of the time (i.e., on guard duty, in a fox hole, etc) wear the proper foot wear (i.e., Mickey mouse boots etc).
- Wear only one pair of socks.
- Wick out excess water.
- Do not wear damaged boots.

Protect Your Fingers

- Don’t wear gloves or mittens that are too tight.
- Allow blood to circulate freely.
- Failure to do so will cause hands to become cold, numb, or stiff.

Sustaining Performance

- Positive Leadership and the Right Attitude (Part 1):
  - Leaders are responsible for prevention of cold injury.
  - Newly assigned individuals, who have little or no cold-weather training and experience, often sustain cold injuries.
  - Soldiers need to be taught that when it is cold, tasks may be more difficult, but they are not impossible.
  - Leaders can build this confidence in their soldiers by having them practice tasks and survival skills outdoors in the cold, and by conducting cold-weather training exercises.

Sustaining Performance

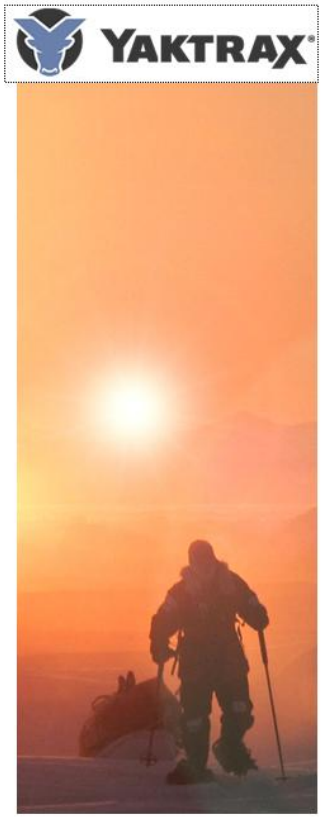
- Positive Leadership and the Right Attitude (Part 2):
  - Leadership must emphasize by example to demonstrate that cold conditions are beatable.
  - Direct supervision should be emphasized.
  - Use the buddy system to maintain communication, and to watch for cold injuries.
  - Keep soldiers busy and physically active. Plan operations carefully to avoid unnecessary periods where troops are left standing in the open.
  - Use hot food to improve morale.
  - Allow soldiers more time to accomplish tasks and more discretion regarding how to accomplish them.

Sustaining Performance

- Limit Exposure
  - Many tasks can be divided into shorter segments to allow re-warming breaks: Guard, Maintenance, etc.
  - For tasks requiring work without gloves, brief re-warming periods in a heated shelter or even time spent with the gloves replaced may maintain sufficient manual dexterity that the task can be completed.
  - It may be necessary to complete the task using a two-team approach, where one team works while the other re-warms.
  - Work should be planned to avoid extended periods of inactivity (e.g. in formation or awaiting transportation) while troops are outside in the cold.

Key Points

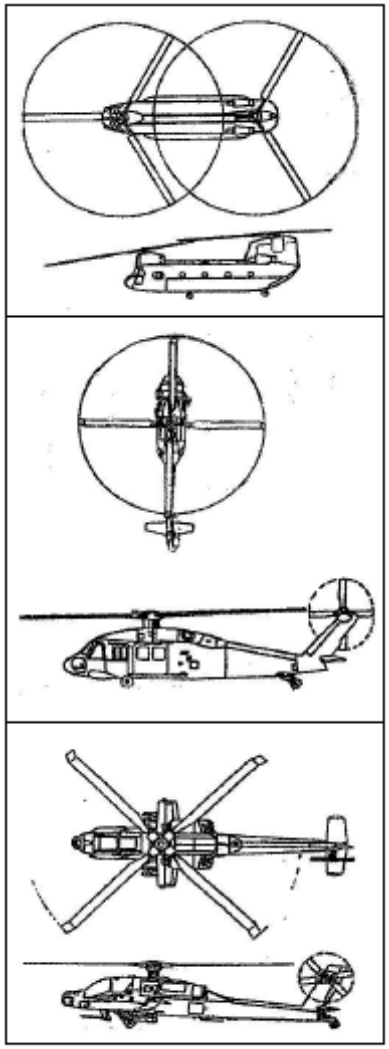
- Shelter from the elements is secondary to defending against enemy actions.
- Eat and drink more food and water than normal.
- Be prepared for sudden weather changes.
- Avoid cold injuries by using a buddy system and frequent self-checks.
- Immediately treat persons showing any sign/symptom of cold injury.
- Sick, injured, and wounded individuals are very susceptible to cold injuries.
- Each soldier should carry an individual cold-weather survival kit at all times.
- Drivers and passengers should always have a sleeping bag and extra cold-weather clothing when traveling by vehicle away from the unit bivouac location.
- Use YAKTRAKS for snow and ice.



Separated from Your Unit

- Keep calm
  - You may only be disoriented. Stop, look and listen for signs of the main unit. Attempt to retrace your path back to your last known position.
- Keep together
  - Groups must not split up. If scouting parties are required, they should consist of at least two soldiers who go only short distances ahead and mark their trail very clearly.
- Keep warm
  - Assemble shelters whenever stopping, even if only for a short time. Whenever possible, use wood or other locally available fuel for fires and conserve POL supplies. Burning a single candle inside a tent or vehicle can provide enough heat to keep the occupants warm.
- Keep fed and hydrated
  - Collect all individual food and water supplies and institute rationing.
- Keep safe
  - If travel on frozen rivers or lakes cannot be avoided, stay near the banks, do not stand close together and watch for spots of unsupported ice resulting from changes in water level.

LZ Requirements



CH-47 Chinook

UH-60 Blackhawk

AH-64 Apache

Smallest Allowable LZ
(with shrubs 3' or less)

70 meter diameter
rotor diameter = 20m
aircraft length = 31m

60 meter Diameter
rotor diameter = 17m
aircraft length = 20m

60 meter Diameter
rotor diameter = 15m
aircraft length = 20m

Know how much to clear for an LZ and be ready to execute

Exception to the above MUST be approved by the Senior Aviation Commander

Cold Weather Survival Kit

- Waterproof matches and fire starter (e.g. Candle, magnesium match, lighter).
- Signaling devices (e.g. Mirror and whistle).
- Knife.
- Pressure bandage, cold-climate lip balm, sunglasses.
- Compass.
- Water container (metal for use in fire).
- Small amount of concentrated food (e.g. MRE or trail mix).
- Foil survival blanket (NSN 7210-00-935-6667).

Wind Chill Chart

Wind Chill Temperature

Wind Speed (mph) ↓	Air Temperature (°F)																	
	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95

Wind speed based on measures at 33 feet height. If wind speed measured at ground level multiply by 1.5 to obtain wind speed at 33 feet and then utilize chart.

WCT (°F) = 35.74 + 0.6215T – 35.75($V^{0.16}$) + 0.4275T($V^{0.16}$)

Where T is temperature (°F) and V is wind speed (mph)

RISK OF FROSTBITE (see times on chart below)

GREEN – LITTLE DANGER (frostbite occurs in >2 hours in dry, exposed skin)
YELLOW – INCREASED DANGER (frostbite could occur in 45 minutes or less in dry, exposed skin)
RED – GREAT DANGER (frostbite could occur in 5 minutes or less in dry, exposed skin)

Time to occurrence of frostbite in minutes or hours in the most susceptible 5% of personnel.

Wind Speed (mph) ↓	Air Temperature (°F)											
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	>2h	>2h	>2h	>2h	31	22	17	14	12	11	9	8
10	>2h	>2h	>2h	28	19	15	12	10	9	7	7	6
15	>2h	>2h	33	20	15	12	9	8	7	6	5	4
20	>2h	>2h	23	16	12	9	8	8	6	5	4	4
25	>2h	42	19	13	10	8	7	6	5	4	4	3
30	>2h	28	16	12	9	7	6	5	4	4	3	3
35	>2h	23	14	10	8	6	5	4	4	3	3	2
40	>2h	20	13	9	7	6	5	4	3	3	2	2
45	>2h	18	12	8	7	5	4	4	3	3	2	2
50	>2h	16	11	8	6	5	4	3	3	2	2	2

WET SKIN COULD SIGNIFICANTLY DECREASE THE TIME FOR FROSTBITE TO OCCUR.

Wind Chill Category

Cold-Weather Training Guidelines

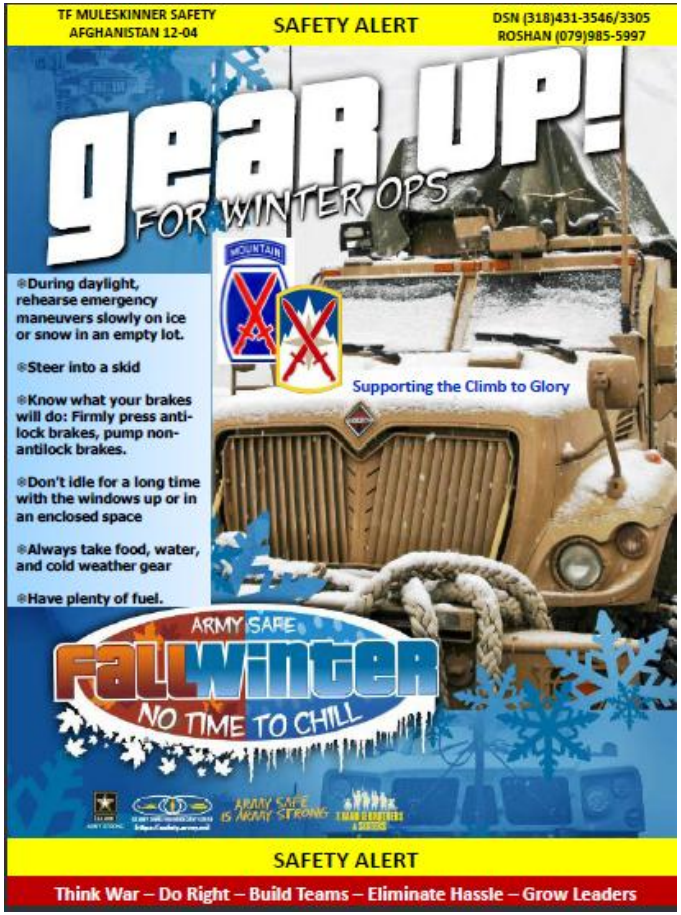
Windchill Category

(see Windchill table)

Work Intensity	Little Danger	Increased Danger	Great Danger
High **Digging foxhole, running, marching with rucksack, making or breaking bivouac**	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
Low **Walking, marching without rucksack, drill and ceremony**	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary **Sentry duty, eating, resting, sleeping, clerical work**	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

Be Prepared for Anything



Further Reading

- FM 31-70, Basic Cold Weather Manual
- FM 31-71, Northern Operations
- FM 31-72, Mountain Operations
- FM 21-10, Field Hygiene and Sanitation
- FM 21-11, First Aid for Soldiers
- TC 21-3, Soldiers Handbook for Individual Operations & Survival in Cold Weather Areas
- US Army Northern Warfare Training Center, Fort Greely, Alaska, Winter Operations Manual

Bottom Line

Soldiers that plan, train, and prepare for the cold…

WIN IN THE COLD!